

Fig. 6 is a view showing an arrangement of the body portion of a content-certified e-mail;

Fig. 7 is a view showing information items contained in the body portion of the content-certified e-mail;

Fig. 8 is a view showing an arrangement of the body portion of a receipt e-mail;

Fig. 9 is a view showing information items contained in the body portion of the receipt e-mail;

Fig. 10 is a view showing an arrangement of the body portion of a review request e-mail;

Fig. 11 is a flowchart showing a content certifying operation;

Fig. 12 is a view showing an arrangement of the body portion of a content certification notice e-mail;

Fig. 13 is a view showing information items contained in the body portion of the content certification notice e-mail;

Fig. 14 is a view showing an arrangement of the body portion of a delivery certification e-mail; and

Fig. 15 is a view showing information items contained in the body portion of the delivery certification e-mail.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The following description will describe embodiments of the present invention in detail with reference to the accompanying drawings.

Fig. 1 shows a content-certified e-mail service system as an embodiment of the present invention. The content-certified e-mail service system includes e-mail terminal devices 1 and 2, a network

arranged system of the present invention with reference to Fig. 2.

In response to sender's manipulation, the e-mail terminal device 1 at the sender's side sends a content certification request e-mail to the e-mail content certifying device 4 (Step S1). The content certification request e-mail is sent by using a mail encryption protocol such as S/MINE. As shown in Fig. 3, the body portion of the content certification request e-mail contains: (a) sender's information; (b) receiver's information; (c) settlement information; (d) text information of content certification; and (e) digital certificate information. The body portion having the foregoing information items is cited in Fig. 4.

The content certification request e-mail sent from the e-mail terminal device 1 at the sender's side is supplied to the e-mail content certifying device 4 through the network 3. When the content certification request e-mail is sent from the e-mail terminal device 1, the e-mail address of the e-mail content certifying device 4 is set in the e-mail terminal device 1 at the sender's side as a destination.

Upon receipt of the content certification request e-mail, the e-mail content certifying device 4 checks the sender by using the (a) sender's information, (d) text information of content certification, and (e) digital certificate information in the body portion of the received content certification request e-mail, and at the same time, checks if there is any tampering with (d-1) text (Step S2). The e-mail terminal device 1 at the sender's side computes the (d-1) text by a predetermined algorithm, encrypts the computation result, and incorporates the encrypted information in

(d-2) sender's digital signature. Hence, the e-mail content certifying device 4 retrieves the encrypted information from the (d-2) sender's digital signature to decrypt the encrypted information, and obtains the computation result by the e-mail terminal device 1 at the sender's side. At the same time, the e-mail content certifying device 4 actually computes the (d-1) text by using a predetermined algorithm, and checks if there is any tampering with the (d-1) text by comparing the former computation result with the latter computation result. Further, the e-mail content certifying device 4 generates (x-1) sender's identifier and (x-2) receiver's identifier, and saves all the information including these identifiers as shown in Fig. 5 in the storage device 4a as one set (one record) of registration information (Step S3). The registration information is contained in the content certificate database as a certified copy of the content certificate. The period of preservation of the registration information in the content certificate database is, for example, five years. Each of the (x-1) sender's identifier and (x-2) receiver's identifier is an identifier used in retrieving one set of registration information from a plurality sets of registration information saved in the content certificate database. Of all the information shown in Fig. 5, not only the (x-1) sender's identifier and (x-2) receiver's identifier, but also (y-1) acceptance date and time, (y-2) transference date and time, (y-3) delivery date and time, and (z-1) delivery information are generated in the e-mail content certifying device 4.

The e-mail content certifying device 4 issues a request

command for a credit card settlement to the settling device 6 (Step S4). The request command uses (c-1) sender's credit card number and (c-2) PIN (Personal Identification Number) of the credit card in the (c) settlement information contained in the body portion of the received content certification request e-mail. The request command sent from the e-mail content certifying device 4 is supplied to the settling device 6 through the special network 5. The settling device 6 settles a payment of the fee for the service provided to the sender of the content certification request e-mail.

The e-mail content certifying device 4 sends a content-certified e-mail to the destination specified by (b-3) receiver's e-mail address (Step S5). The content-certified e-mail is sent by using a mail encryption protocol such as S/MINE. Also, as shown in Fig. 6, the body portion of the content-certified e-mail contains (h) content certificate information, (d) text information of content certification, and (e) digital certificate information. Each of the foregoing information items is cited in Fig. 7.

The content-certified e-mail sent from the e-mail content certifying device 4 is saved in a storage region corresponding to the (b-3) receiver's e-mail address in an unillustrated receiver's mail server through the network 3. If the e-mail address coincides with the e-mail address of the receiver using the e-mail terminal device 2 at the receiver's side, in response to a receiver's manipulation, the e-mail terminal device 2 at the receiver's side accesses the storage region corresponding to the (b-3) receiver's e-mail address in the receiver's mail server

through the network 3, and reads out the content-certified e-mail saved in the storage region.

Upon receipt of the content-certified e-mail, the receiver can confirm that there is no tampering with the (h) content certificate information and the (d-1) text of content certification sent from the sender, based on the foregoing information.

Upon sending of the content-certified e-mail, the e-mail content certifying device 4 updates the (y-2) transference date and time and (z-1) delivery information in the corresponding record within the content certificate database (Step S6).

In addition, the e-mail content certifying device 4 sends a receipt e-mail to the address specified by the (a-3) sender's e-mail address (Step S7). The receipt e-mail is sent by using a mail encryption protocol such as S/MINE. In addition, as shown in Fig. 8, the body portion of the receipt e-mail includes (i) receipt information, (d) text information of content certification, and (e) digital certificate information. Each of the foregoing information items is cited in Fig. 9.

The receipt e-mail sent from the e-mail content certifying device 4 is saved in a storage region corresponding to the (a-3) sender's e-mail address in an unillustrated sender's mail server through the network 3. If the e-mail address coincides with the e-mail address of the sender using the e-mail terminal device 1 at the sender's side, in response to a sender's manipulation, the e-mail terminal device 1 at the sender's side accesses the storage region corresponding to the (a-3) sender's e-mail address in the

sender's mail server through the network 3, and reads out the receipt e-mail saved in the storage region.

The sender who received the receipt e-mail can confirm that there is no tampering with the (i) receipt information and the (d-1) text of content certification, based on the foregoing information.

Also, the sender is allowed to review a certified copy saved in the content certificate database later if the sender presents the receipt in the text of the receipt e-mail received from the e-mail content certifying device 4 by reviewing means described below.

Next, the following description will describe a reviewing operation that allows the sender to review the certified copy.

In response to a sender's manipulation, the e-mail terminal device 1 at the sender's side sends a review request e-mail to the e-mail content certifying device 4 (Step S11). The review request e-mail is sent by using a mail encryption protocol such as S/MINE. Also, as shown in Fig. 10, the body portion of the review request e-mail contains the (i) receipt information.

The review request e-mail sent from the e-mail terminal device 1 at the sender's side is supplied to the e-mail content certifying device 4 through the network 3.

Upon receipt of the review request e-mail, the e-mail content certifying device 4 retrieves one set of registration information from the content certificate database based on the (x-1) sender's identifier in the (i) receipt information presented in the body portion of the e-mail (Step S12). As previously mentioned, each

set of registration information contains the (x-1) sender's identifier and (x-2) receiver's identifier. This makes it possible to retrieve one set of registration information corresponding to the (x-1) sender's identifier. Upon retrieval of the corresponding set of registration information, the e-mail content certifying device 4 checks whether the (i) receipt information in the body portion of the received review request e-mail is correct or not (Step S13). The check is performed by using the (e-2) digital certificate of the e-mail content certifying device contained in the retrieved registration information and (i-2) the digital signature of the e-mail content certifying device in the (i) receipt information in the body portion of the received review request e-mail.

Upon check of the (i) receipt information in the body portion of the review request e-mail received in Step S13, the e-mail content certifying device 4 sends a review result e-mail to the address specified by the (a-3) sender's e-mail address (Step S14). The review result e-mail is sent by using a mail encryption protocol such as S/MINE. Also, the information items contained in the body portion of the review result e-mail are the same as those in the receipt e-mail cited in Fig. 8.

The review result e-mail sent from the e-mail content certifying device 4 is read out by the e-mail terminal device 1 at the sender's side from the storage region corresponding to the (a-3) sender's e-mail address in the sender's mail server in the same manner as the foregoing receipt e-mail.

Upon receipt of the review result e-mail, the sender can

confirm the (d-1) text of content certification from the text therein.

According to the above embodiment, by constructing the e-mail content certifying device 4 under administration of a third party on the network 3, e-mail users who wish to send a content-certified e-mail can use the content-certified e-mail delivery service by merely sending a content certification request e-mail to the e-mail content certifying device 4, so that the contents of an e-mail is certified by a third party and a content-certified e-mail is sent to the destination. Consequently, unlike the current content-certified postal service, the e-mail users can save time and labor in (1) preparing a hard copy of text in triplicate and (2) taking the hard copy in triplicate to a post office. Hence, convenience of each of the e-mail users is increased, and a notice pertaining to law such as a notice of cooling off can be sent by an e-mail. Thus, more extensive use of e-mails can be expected.

In the foregoing first embodiment, it is generally difficult to confirm at the sender's side whether a content-certified e-mail has been correctly delivered to the destination on the Internet in a secure manner. However, delivery certification of a content-certified e-mail can be realized in the same manner as a delivery-certified mail in the current postal service if the e-mail content certifying device 4 is furnished with a function to serve as a Web server and the e-mail terminal device 2 at the receiver's side is provided with a Web browser.

Next, the following description will describe, with reference to Fig. 11, an operation of the e-mail content certification

e-mail content certifying device 4 updates the (y-2) transference date and time and (z-1) delivery information in the corresponding record in the content certificate database (Step S6). This action is identical with Step S6 cited in Fig. 2.

Upon receipt of the content certification notice e-mail, the e-mail terminal device 2 at the receiver's side accesses the Web server in the e-mail content certifying device 4 in response to a receiver's manipulation (Step S21). The access destination is located in a region within the Web server indicated by (j-2) URL information of the e-mail content certifying device 4 in the (j) content certification notice information in the body portion of the content certification notice e-mail. This access is gained by the e-mail terminal device 2 at the receiver's side through the network 3.

The Web server in the e-mail content certifying device 4 sends source data that contains an HTML file of the accessed URL to the e-mail terminal device 2 at the receiver's side (Step S22). The source data is supplied to the e-mail terminal device 2 at the receiver's side from the e-mail content certifying device 4 through the network 3.

The e-mail terminal device 2 at the receiver's side receives the source data sent from the Web server and displays an Web page on the display screen (Step S23). The receiver can input information on the Web page for the information items: the (x-2) receiver's identifier and (b-3) receiver's e-mail address.

By manipulating keys, the receiver inputs characters on the Web page for the information items: the (x-2) receiver's

text of content certification on the display screen (Step S31).

Upon completion of the sending action in Step S30, the e-mail content certifying device 4 updates the (y-2) transference date and time and (z-2) delivery information in the corresponding record within the content certificate database (Step S32), and sends a delivery certification e-mail to the address specified by the (a-3) sender's e-mail address (Step S33). The delivery certification e-mail is sent by using a mail encryption protocol such as S/MINE. Also, as shown in Fig. 14, the body portion of the delivery certification e-mail contains (k) delivery certificate information and (e) digital certificate information. Each of the foregoing information items is cited in Fig. 15.

The delivery certification e-mail sent from the e-mail content certifying device 4 is read out by the e-mail terminal device 1 at the sender's side from the storage region corresponding to the (a-3) sender's e-mail address in the sender's mail server in the same manner as the foregoing receipt e-mail.

Upon receipt of the delivery certification e-mail, the sender can confirm that the (d-1) text of content certification has been delivered to the receiver based on the foregoing information.

The reviewing operation that allows the sender to review a certified copy is omitted in Fig. 11. It should be appreciated, however, that the reviewing operation is carried out in the same manner as was explained in the first embodiment.

As has been discussed, according to the second embodiment, the e-mail terminal device 2 at the receiver's side uses the Web browser, so that the receiver retrieves the text of the content-

certified e-mail by the receiver's manipulation. This makes it possible to determine the exact date and time the receiver received the text of the content-certified e-mail. Consequently, a delivery certificate as an evidence of the delivery of the content-certified e-mail to the receiver can be issued to the sender, and the same function as the delivery-certified mail in the current postal service can be realized on the Internet. Hence, the e-mail users can send a notice that requires a record of the delivery date by an e-mail.

In addition, by combining the first and second embodiments, a content-certified e-mail having its contents certified by a third party with a delivery certificate can be sent/received through the e-mail service on the Internet, thereby making it possible to send a notice pertaining to law or the like by an e-mail. Accordingly, e-mails are used extensively, and the e-mail users' convenience can be increased.

In the first embodiment, the reviewing operation of the content-certified e-mail was explained by way of the e-mail sending/receiving method between the e-mail terminal device 1 at the sender's side and e-mail content certifying device 4. However, the reviewing operation can be effected also by furnishing the e-mail terminal device 1 at the sender's side with a function serving as the Web browser, and the e-mail content certifying device 4 with a function serving as the Web server.

As has been discussed, in the content-certified e-mail service system of the present invention, an e-mail containing the content-certified text is sent to the e-mail terminal device at

the receiver's side by merely sending a content certification request e-mail from the e-mail terminal device at the sender's side to the e-mail content certifying device. Also, the content-certified text is saved in the e-mail content certifying device as the registration information. Consequently, the contents of a text of an e-mail can be certified readily in a reliable manner.